uFR Online – Quick Start Guide
Version 1.2

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Installing uFR Online Reader

Follow the instructions below to install your uFR Online reader.

Step 1: Power on a device

1. Connect device to a power source.
2. Wait for a few moments to device boot in Access Point mode (see LED status table below).

Step 2: Connect to the uFR Online

1. Scan for networks using your WiFi enable device (computer, smartphone etc.).
2. Connect to device named ONxxxxxx.
3. Wait for the connection to be made successfully.
4. Open your favorite web browser and navigate to http://192.168.4.1

Step 3: Set up your device

1. After web page is loaded successfully log in using default credentials (see table 1 below).
2. Wait for a few moments to device scan for an available WiFi networks.
3. Select a WiFi network and click connect button.
4. Enter password for wireless network if needed and wait to connect successfully.

Step 3: Finish setting up your device

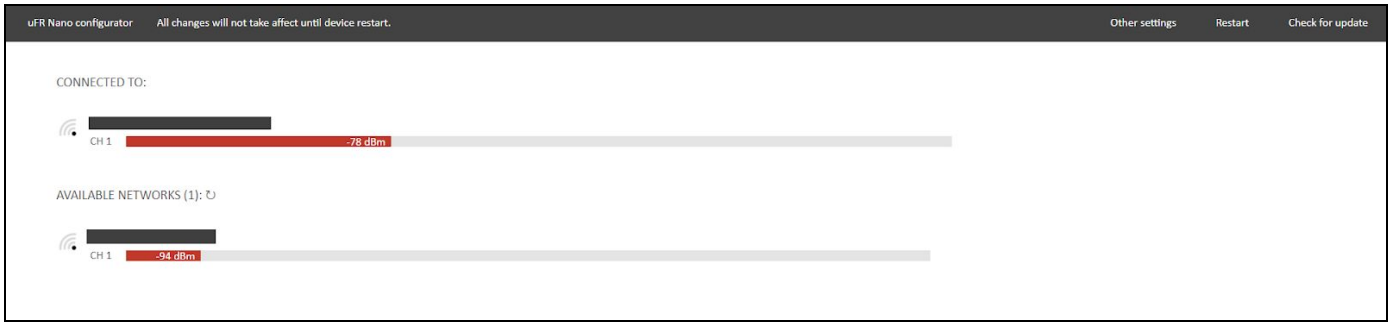
1. Click on uFR Online button on top left corner to find out your new IP address.
2. Reboot your uFR Online reader.

uFR Online Reader settings

Follow the instructions below to change uFR Online reader settings.

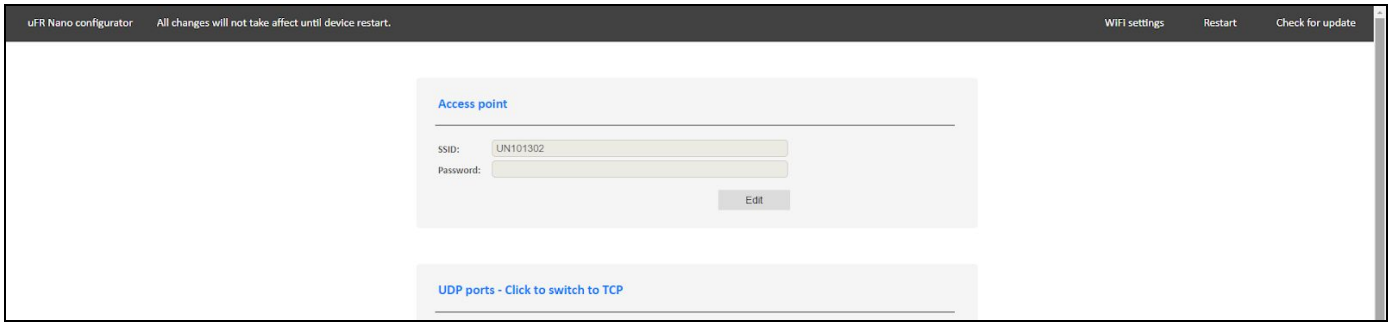
Open WiFi network settings dashboard

1. Open your favorite web browser and navigate to http://<device-ip-address>.
2. Log in using default credentials (see table 1 below).
3. After web page is loaded successfully, WiFi settings dashboard will be shown.



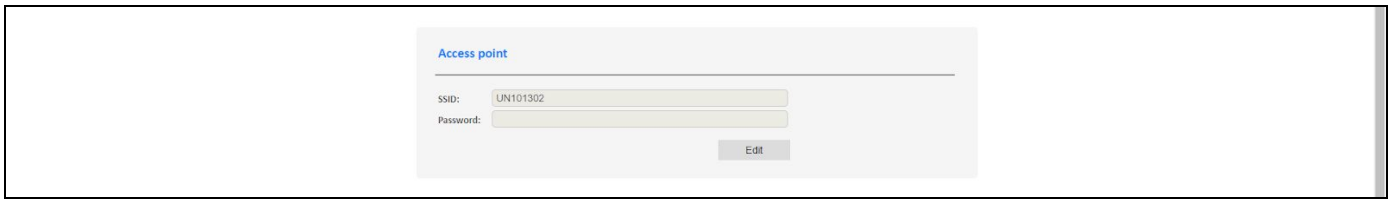
Open advanced settings dashboard

1. Follow the instruction above (WiFi network setting section).
2. Click on Other settings button.
3. Advanced settings dashboard will be shown on screen.



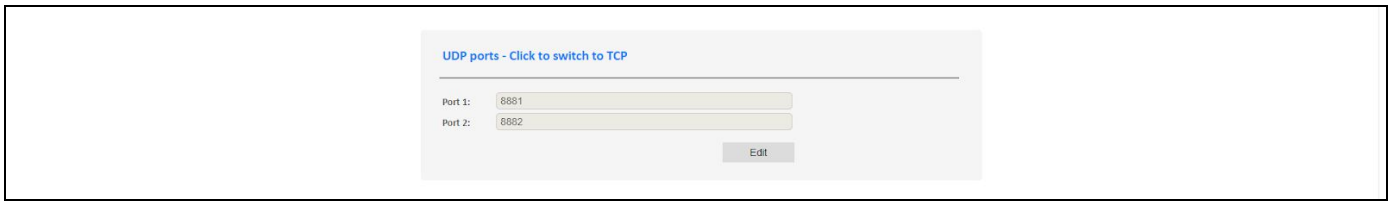
Access Point settings

1. Open advanced settings dashboard.
2. Click on Edit button in section Access point.
3. Change fields SSID and Password.
4. Click on button Save.



UDP/TCP ports and protocols settings

1. Open advanced settings dashboard.
2. Click on Edit button in section UDP/TCP ports..
3. Change fields Port 1 and Port 2.
4. Click on button Save.
5. Click on UDP/TCP ports header text to toggle between this two protocols.



UART settings

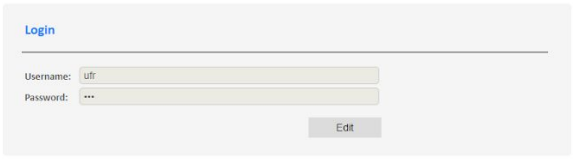
1. Open advanced settings dashboard.
2. Click on Edit button in section UART Baud rates.
3. Change fields UART 1 and UART 2.
4. Click on button Save.
5. Click on UART2 RS485 disabled/enabled to toggle RS485 support on second serial port.

Transparent mode settings

1. Open advanced settings dashboard.
2. Click on Edit button in section Transparent mode.
3. Change field Reader to toggle between first and second serial ports.
4. Click on button Save.
5. Click on Transparent disabled/enabled text to toggle transparent mode.

Login credentials settings

1. Open advanced settings dashboard.
2. Click on Edit button in section Login.
3. Change fields Username and Password.
4. Click on button Save.



Master/Slave mode settings

1. Open advanced settings dashboard.
2. Click on text Working in Master/Slave mode to toggle between this two modes.

Bluetooth Serial mode settings – available in versions 2.0+

1. Open advanced settings dashboard.
2. Click on text Bluetooth mode enabled/disabled to toggle Bluetooth serial mode.
3. This settings is only available in slave mode only if Blutooth Low Energy mode is disabled.

Bluetooth HID mode settings – available in versions 2.0+

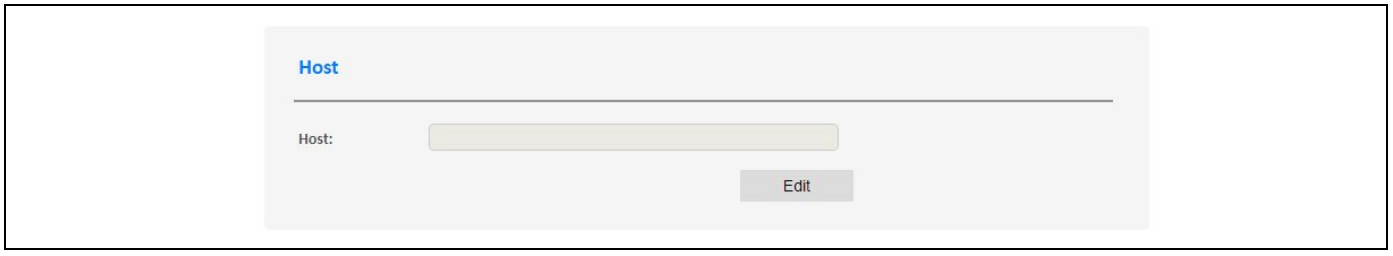
1. Open advanced settings dashboard.
2. Click on text Bluetooth mode enabled/disabled to toggle HID mode.
3. This settings is only available in master mode.

Bluetooth Low Energy mode settings – available in versions 2.0+

1. Open advanced settings dashboard.
2. Click on text Bluetooth Low Energy mode enabled/disabled to toggle BLE mode.
3. This settings is only available in slave mode and only if Blutooth Serial mode is disabled.

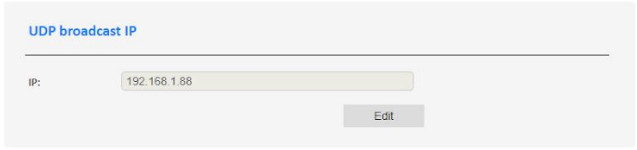
Host address settings

1. Open advanced settings dashboard.
2. Click on Edit button in section Host.
3. Change field Host.
4. Click on button Save.
5. This settings is only available in master mode.



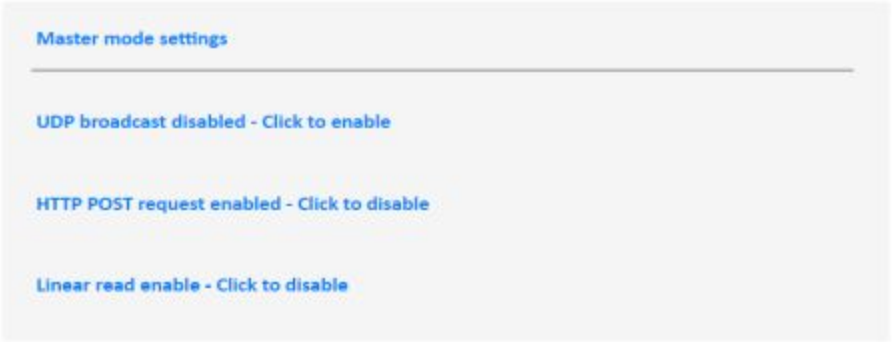
UDP broadcast IP settings

1. Open advanced settings dashboard.
2. Click on Edit button in section UDP broadcast IP.
3. Change field IP.
4. Click on button Save.
5. This settings is only available in master mode.



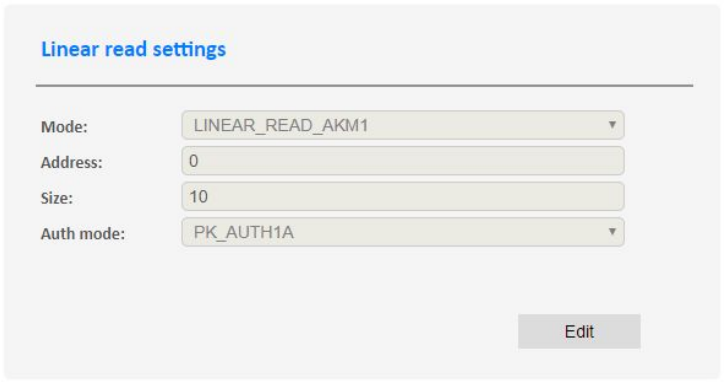
Master mode settings

1. Open advanced settings dashboard.
2. Switch to master mode.
3. Click on option what you want to enable or disable.
4. This settings is only available in master mode.



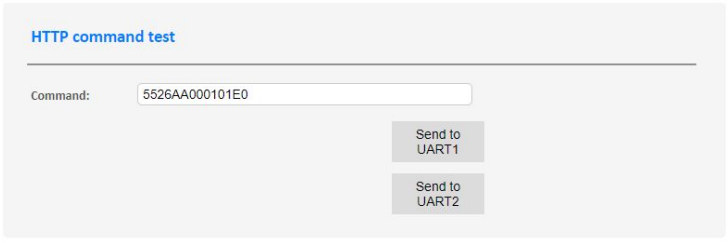
Linear read settings

1. Open advanced settings dashboard.
2. Switch to master mode.
3. Enable Linear read.
4. Click on Edit button and change linear read settings.
5. Click on button Save.
6. This settings is only available in master mode.



HTTP command test

1. Open advanced settings dashboard.
2. Write HEX string in field Command.
3. Click on button Sent to UART1/UART2.



For more informations about COM protocol visit:
https://www.d-logic.net/code/nfc-rfid-reader-sdk/ufr-doc/raw/master/uFR_COM_Protocol.pdf

UDP bradcast IP settings

1. Open advanced settings dashboard.
2. Click on Edit button and change UDP broadcast IP address.
3. Click on button Save.
4. This settings is only available in master mode.

Install uFR firmware

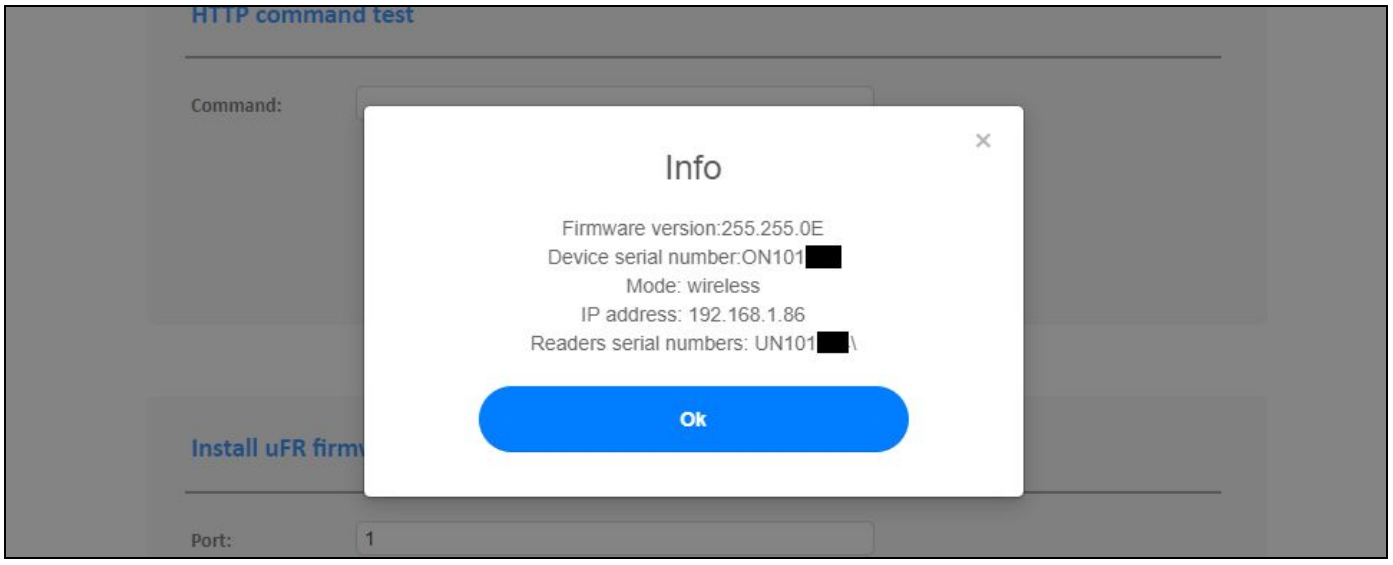
1. Open advanced settings dashboard.
2. Navigate to install uFR firmware section.
3. Select port and click Get available firmwares button.
4. Click on firmware version to install and wait for confirmation message.

Modem sleep settings

1. Open advanced settings dashboard.
2. Navigate to Modem sleep section.
3. Click on text Modem sleep enabled/disabled to toggle.
3. Modem sleep can reduce permormace, but also reduces heating significantly.

Basic information

1. Click on uFR Online button on top left corner.
2. Basic information about device will pop up on screen.



uFR Online LED status table

In table below are described all LED states of uFR Online.

LED status color		Description
Steady white	Steady white	Device is booted. Waiting for connection.
Steady blue	Steady blue	Device is booted in Bluetooth serial mode.
Steady cyan	Steady yellow	Device connected to WiFi in Slave mode.
Steady cyan	Steady cyan	Device connected to LAN in Slave mode.
Steady blue	Steady magenta	Device connected to WiFi in Master mode.
Steady magenta	Steady magenta	Device connected to LAN in Master mode.
Blinking cyan	Blinking yellow	Device is visible as AP in Slave mode.
Blinking blue	Blinking magenta	Device is visible as AP in Master mode.
Steady blue	Steady blue	Device is booted in Bluetooth serial mode.
Steady orange	Steady orange	Device is booted in HID mode.
Steady light blue	Steady light blue	Device booted in Bluetooth Low energy mode.
Steady red	Steady red	Device is booted in uFR Nano flashing mode.
Steady green	Steady green	Device is updating firmware OTA.

uFR Online default settings table

In table below are shown default settings for uFR Online.

Parameter	Value
Access point IP address	192.168.4.1
Server protocol	UDP
Port 1	8881
Port 2	8882
UART1 baud rate	115200
UART2 baud rate	115200
RS485 support	Disabled
Transparent mode	Enabled
Transparent device	1
Master/Slave mode	Slave
AP SSID	uFR Online Serial number (ONxxxxxx)
AP password	None
Login username	ufr
Login password	ufr
Discovery server port	8880
Master mode POST request	Enabled
Master mode UDP broadcast	Enabled
Master mode UDP broadcast address	Local broadcast address (eg. X.X.X.255)
Master mode linear read	Disabled
Default Blutooth Low Energy mode PIN	123456

uFR Online REST services

In table below are described all REST services available on uFR Online. HTTP method is POST. Basic Authorization is needed except for /uart1 and /uart2. Username and password are same as Login.

URL	Parameters	Description
/info	None	Get configuration info.
/scan	None	Get available WiFi networks.
/togglemode	None	Toggle master/slave mode.
/toggletransparent	None	Toggle transparent mode.
/changetransparent	None	Change transparent device.
/changeap	ssid, password	Change device AP SSID and password.
/changehost	host	Change master mode host.
/changebroadcast	ip	Change master mode UDP broadcast IP.
/changeauth	username, password	Change authorization credentials.
/changesta	ssid, password	Connect to WiFi network.
/setport	port1, port2	Change UDP/TCP ports.
/disconnect	None	Disconnect from WiFi network.
/restart	None	Reboot device.
/toggleserver	None	Toggle UDP/TCP protocol. Only in slave mode.
/toggleble	None	Toggle Bluetooth Low Energy mode.
/setbaud	uart1, uart2	Change UART1 and UART2 baud rates.
/setdefaultbaud	uart	Reset connected uFR device to default baud rate.
/toggle485	None	Toggle UART2 RS485 support.
/setdefault	None	Reset device to factory default settings.

/togglepost	None	Toggle master mode POST request.
/togglebroadcast	None	Toggle master mode UDP broadcast.
/togglelinear	None	Toggle linear read. Only in master mode.
/changelinearmode	mode	Change linear read mode (1-8).
/changelinearsize	begin, size	Change linear read address and size.
/changelinearauth	auth	Change linear read authmode (0x60, 0x61...)
/changelinearkeyindex	index	Change linear read key index (0-31).
/changelinearkey	HEX string	Change linear read key.
/uart1	HEX string	Send HEX string command to UART1.
/uart2	HEX string	Send HEX string command to UART2.
/tooglebt	None	Toggle Bluetooth Serial mode.
/togglesleep	None	Toggle Modem sleep.
/update	requested_fw_version	Request firmware and update
/getufrlist	uart	Get uFR Nano firmware list
/ufrupdate	uart, vers	Update uFR Nano. Request /getufrlist first.

uFR Online Reader basic usage

In this section will be described how to use uFR Online reader.

UDP/TCP communication

- All bytes sent to UDP/TCP port 1 will be forwarded to UART1 and vice versa.
- All bytes sent to UDP/TCP port 2 will be forwarded to UART2 and vice versa.
- uFR Series libraries has support for UDP/TCP communication.
- UDP/TCP mode works in parallel with Transparent and HTTP mode.

UDP/TCP communication – Reader opening example

```
/*
Opening reader on IP address 192.168.1.112 and port 8881 for UDP communication.
*/
ReaderOpenEx(0, "192.168.1.112:8881", 'U', 0);

/*
Opening reader on IP address 192.168.1.112 and port 8881 for TCP communication.
*/
ReaderOpenEx(0, "192.168.1.112:8881", 'T', 0);
```

Bluetooth serial mode communication

- All bytes sent to Bluetooth serial port will be forwarded to UART1 or UART2 and vice versa.
- Bluetooth mode doesn't work in parallel with UDP/TCP and HTTP mode.

Bluetooth serial mode communication – Reader opening example

```
/*
Opening reader in Bluetooth serial mode on virtual port COM34. Must disable reset on opening.
*/
ReaderOpenEx(2, "COM34", 0, "UNIT_OPEN_RESET_DISABLE");
```

Bluetooth serial mode communication

- All bytes sent to USB serial port will be forwarded to UART1 or UART2 and vice versa.
- Transparent mode works in parallel with UDP/TCP and HTTP mode.

Transparent mode communication – Reader opening example

```
/*
Opening reader in Transparent mode. Must disable reset on opening.
*/
ReaderOpenEx(2, 0, 0, "UNIT_OPEN_RESET_DISABLE");
```

HTTP mode communication

- All HEX string bytes sent in POST body will be forwarded to UART1 or UART2 and vice versa.
- HTTP mode works in parallel with UDP/TCP and Transparent mode.

HTTP mode communication – GetCardIdEx example

```
/*
Getting Card ID in HTTP mode using HTTP POST request.
*/

HTTP POST Request body sent to uFR Reader /uart1 or /uart2 > 557caa00aaccec

HTTP POST Response body sent from uFR Reader > de7ced0b08044f52dad995000000000000cb
```

uFR Online Reader protocols structure

In this section will be described how to use uFR Online reader.

Master mode POST request

- In master mode if card is detected, device sends HTTP POST request to host.
- HTTP response must be "OK" or "FAILED" **for firmware version 1.5.4 and below.**
- If response is "OK", device will beep once and turn on green LED.
- If response is "FAILED", device will beep twice and turn on red LED.
- If server doesn't response is, device will beep three times and turn on red LED.
- **For firmware version 1.6.0 and above see Master mode POST response protocol section.**

Master mode HTTP POST request structure					
*	Form parameters				
Linear read disabled	SN	UID	CTRLINFO	ONLINE	
Linear read enabled	SN	UID	CTRLINFO	ONLINE	DATA
Description	Reader Serial number	Card UID	Control number from 0 to 255	Number 1 or 2 depends of reader	Linear read data as HEX string

Master mode POST response

- When server received POST request, uFR Online is waiting for HTTP response.
- Response contains HEX String commands from uFR COM protocol.
- Response must contains 3 rows delimited by newline character (\n), one for each UART.
- CMD-EXT must be sent in one string preceded by CMD, without any delimiter.
- Sending multiple commands can be done by spliting multiple strings with whitespace delimiter.

Master mode HTTP POST response structure				
Command sent to UART2	\n	Command sent to UART1	\n	Command sent to Transparent UART
Example - Sending USER_INTERFACE_SIGNAL command to UART1 and UART2				
5526AA000101E0	\n	5526AA000000E0	\n	0
Command sent to UART1	\n	Command sent to UART2	\n	Nothing sent to Transparent UART
Example - Sending USER_DATA_WRITE command to UART1 (CMD_EXT)				
551CAA110000F96A6A0000360000003000 32003800410054	\n	0	\n	0
Command sent to UART1	\n	Nothing sent to UART2	\n	Nothing sent to Transparent UART

- PHP Server API for handling Master mode request with example is available at: https://www.d-logic.net/code/nfc-rfid-reader-sdk/ufr_online-examples-php-master_mode

Master mode UDP broadcast

- In master mode if card is detected and UDP broadcast is enabled, device sends UDP broadcast.
- If HTTP POST request is enabled, indication is same as described above.
- If HTTP POST request is disabled, device will beep once and turn on green LED.

Master mode UDP broadcast structure
80/ReaderSerialNumber/CardUID/0

UDP discovery server

- UDP discovery server is used for finding uFR readers in local network.
- Send any UDP packet to uFR reader port 8880 and wait for response.

UDP discovery server response example																	
*					**UART 1 PORT**							**UART 2 PORT**					
*	**IP address**				**Port**		**CP**	**Baud rate**				**Port**		**CP**	**Baud rate**		
DEC	192	168	1	5	8881		'T'	115200				8882		'U'	250000		
HEX	C0	A8	01	05	B1	22	54	00	C2	01	00	B2	22	55	90	D0	03	00
*CP is network communication protocol. 'T' stands for TCP and 'U' for UDP.																	

uFR Online only COM protocol commands

- This commands are uFR Online only.
- Commands are sent in ASCII mode
- Commands be used in Transparent, Bluetooth Serial and Bluetooth Low Energy mode.

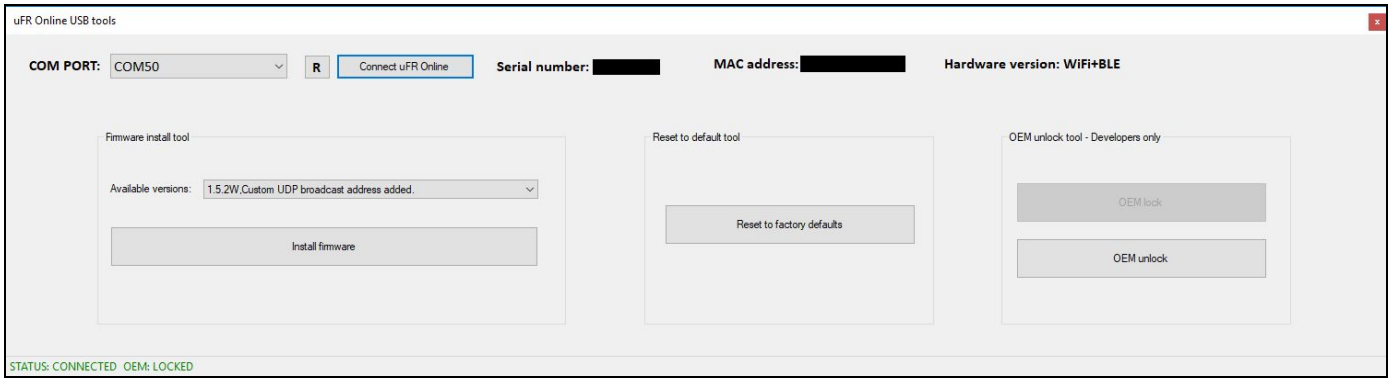
Command	Description
!TURN_MST_MODE_ON!	Toggle device to WiFi master mode.
!TURN_SLV_MODE_ON!	Toggle device to WiFi slave mode.
!TURN_BLE_MODE_ON!	Toggle device to Bluetooth Low Energy mode.
!TURN_SPP_MODE_ON!	Toggle device to Bluetooth Serial mode.
!TURN_HID_MODE_ON!	Toggle device to Bluetooth HID mode.
!TURN_AP0_MODE_ON!	Turn off Access Point when Bluetooth is using.
!TURN_AP1_MODE_ON!	Turn on Access Point when Bluetooth is using.
!TURN_LD0_MODE_ON!	Turn off LED indication when Bluetooth is using.
!TURN_LD1_MODE_ON!	Turn on LED indication when Bluetooth is using.

uFR Online Reader tools

In this section will be described available uFR Online reader tools.

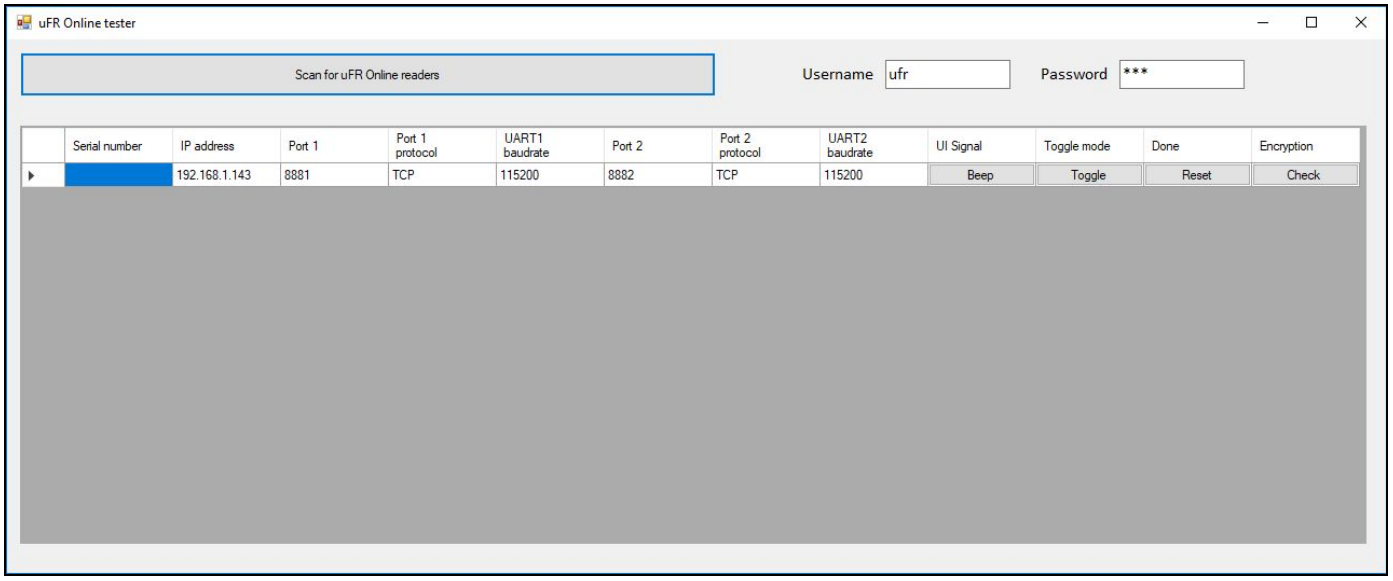
uFR Online flasher oneclick – Update tool

- This tool is used for installing firmware and OEM unlocking device.
- Download tool from: www.d-logic.net/code/nfc-rfid-reader-sdk/ufr_online-flasher-oneclick



uFR Online finder – Network discovery tool

- This tool is used for finding device in local network.
- Download tool from: www.d-logic.net/code/nfc-rfid-reader-sdk/ufr_online_finder



uFR NFC Browser Extension

In this section will be described how to use uFR NFC Browser extension with uFR Online reader.

uFR NFC Browser Extension – Useful links

Google Chrome and Opera download link:
https://chrome.google.com/webstore/detail/nfc-reader-browser-extens/kjfmmgpfhdohhcodbkaodgkidbenkgog

Mozilla Firefox download link:
https://addons.mozilla.org/en-US/firefox/addon/nfc-reader-browser-extension/?src=search

Native host installers for Window, Linux and MacOS download link:
https://www.d-logic.net/code/nfc-rfid-reader-sdk/ufr-browser_extensions/tree/master/Store%20installers

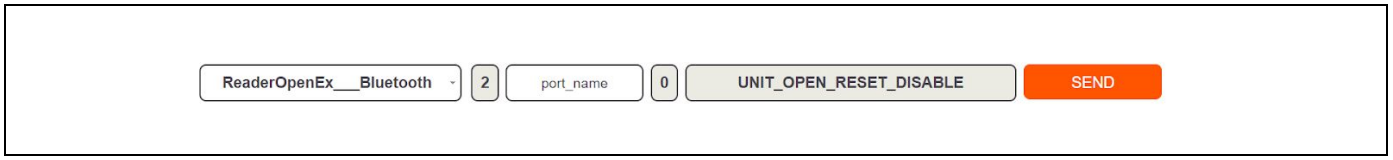
uFR NFC Browser Extension demo web app:
https://www.d-logic.net/browser-extension-demo/

uFR Reader API reference document:
https://www.d-logic.net/code/nfc-rfid-reader-sdk/ufr-doc/blob/master/uFR%20Series%20NFC%20reader%20API.pdf

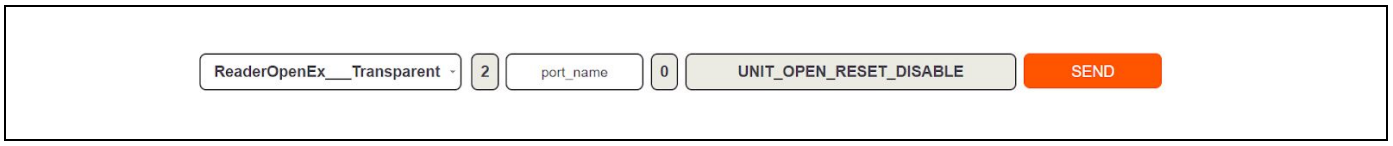
uFR NFC Browser Extension - UDP reader opening example

uFR NFC Browser Extension - TCP reader opening example

uFR NFC Browser Extension - Bluetooth serial reader opening example



uFR NFC Browser Extension - Transparent serial reader opening example



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Revision history

Date	Version	Comment
2019-04-11	1.0	Base document
2019-05-09	1.1	Master mode communication protocol changed
2019-06-17	1.2	Added firmware 2.0+ changes

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